

[*SGML Version - See Change Record*]
TECHNICAL MANUAL

NAVAL SHIPBOARD KETTLE, STEAM

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RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

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TABLE OF CONTENTS

Chapter/Paragraph	Page
Equipment Description	1-1
Unpacking The Kettle	1-2
Installation	1-2
Initial Start-Up	1-3
Operation	1-4
A. To Start Kettle	1-4
B. To Shut Down Kettle	1-4
Sequence of Operation	1-4
Maintenance & Cleaning	1-4
A. MAINTENANCE	1-4
1. Periodic Maintenance	1-5
2. Jacket Vacuum	1-5
3. Jacket Filling and Water Treatment	1-6
4. Component Replacement	1-7
B. CLEANING	1-7
1. Suggested Tools	1-7
2. Precautions	1-7
3. Procedure	1-7
Troubleshooting	1-8
References	1-9
Parts List	1-10
Parts List	1-11
Wiring Diagrams for units manufactured before Sept 1, 1988	1-14
Wiring Diagrams for units manufactured after Sept 1, 1988 & before June 1, 1990	1-18
Wiring Diagrams for units manufactured after June 1, 1990	1-22
Three-Year Limited Warranty To Commercial Purchasers*	1-26

LIST OF TABLES

Table	Title	Page
	KETTLE CHARACTERISTICS	1-1
	TDB/7 ELECTRICAL SPECIFICATIONS	1-3
	Troubleshooting	1-9
	MANUFACTURER’S CROSS-REFERENCE PARTS LIST	1-27

LIST OF ILLUSTRATIONS

Figure	Title	Page
	TDB/7-20 208-240V 1 PH	1-15
	TDB/7-20 208-240V 3 PH	1-15
	TDB/7-20 480V 1 PH	1-16
	TDB/7-20 480V 3 PH	1-16
	TDB/7-20 208-240V 1 PH	1-17
	TDB/7-40 208-240V 3 PH	1-17
	TDB/7-40 480V 1 PH	1-18
	TDB/7-40 480V 3 PH	1-18
	TDB/7-20 208-240V 1 PH	1-19
	TDB/7-20 208-240V 3 PH	1-19
	TDB/7-20 480V 1 PH	1-20
	TDB/7-20 480V 3 PH	1-20
	TDB/7-40 208-240V 1 PH	1-21
	TDB/7-40 208-240V 3 PH	1-21
	TDB/7-40 480V 3 PH	1-22
	TDB/7-40 480V 1 PH	1-22
	TDB/7-20 & TDB/7-40 208-240V 1&3 PH	1-23
	TDB/7-20 & TDB/7-40 380/415V 3 PH	1-23
	TDB/7-20 & TDB/7-40 480V 1&3 PH	1-24
	Service Log	1-25
	Classification of TMDER	Rear-2
	Envelope	Rear-3

CHAPTER 1

Equipment Description

The Groen TDB/7 is a table top, tilting, steam jacketed kettle with a thermostatically controlled, self-contained, electrically heated steam supply and appropriate controls, all mounted on a sturdy base. Model TDB/7 is available in 20 or 40-quart capacity.

The body of the TDB/7 Kettle is constructed of stainless steel welded into one solid piece. the kettle is furnished with a reinforced rim and a butterfly shaped pouring lip and has a steam jacket rated for pressures up to 50 PSI. Finish of the kettle is 180 emery grit on the inside and bright semi-deluxe on the outside. Bottom-heavy design causes the kettle to return from tilted to upright position when released. Pouring height allows the filling of pans up to 4 inches high on a table top.

A built-in steam generator, sized for a kettle capacity and heated by electricity, feeds steam into the jacket. "Airless" operation of the steam jacket permits uniform, efficient heating at temperatures as low as 150°F and as high as 298°F. In addition to the adjustable thermostat for operating control, the unit has a tilt cut-off switch, safety valve, and high-limit thermostat as safety features and a pilot lamp, pressure gauge, and gauge glass for monitoring the operation of the kettle.

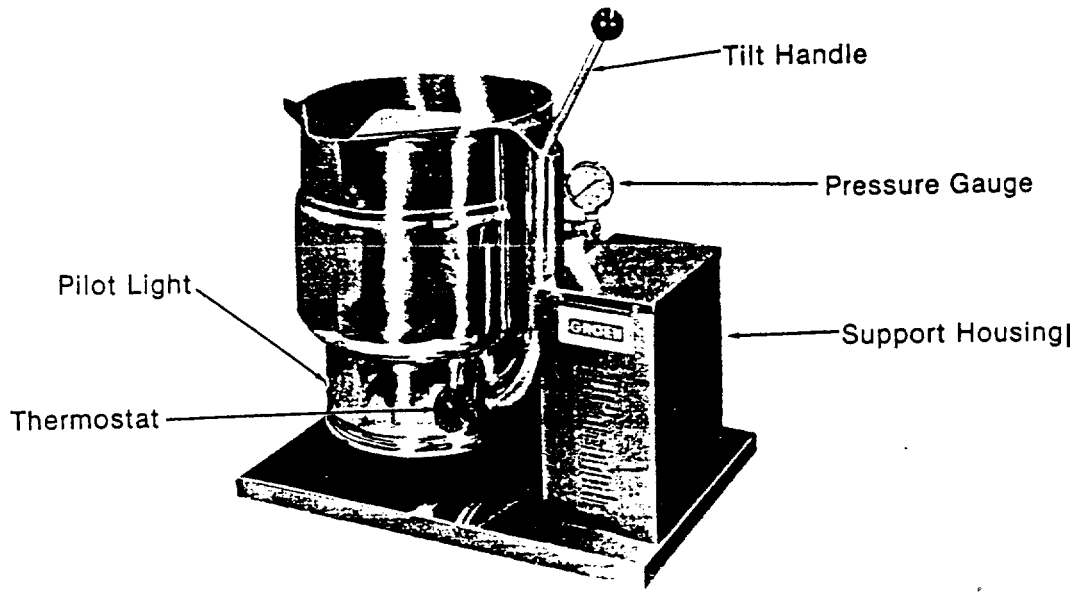
Only a single electrical connection is required. The unit may be ordered for use with single or three phase, 208, 240, or 480 volt power.

KETTLE CHARACTERISTICS

	TDB/7-20		TDB/7-40	
Kettle Capacity	20 qts.	18.8/	40 qts.	37.6/
Jacket Capacity	4 qts.	3.7/	5 qts.	4.7/
Diameter	14"	36 cm	16 1/2"	42 cm
Depth	11"	28 cm	14 1/4"	36 cm
K.W. at 208 V	6.3		10.8	
K.W. at 240 V	6.3		12.0	
K.W. at 480 v	6.3		12.0	
Base Width	24"	60 cm	24"	60 cm
Base Depth	16"	41 cm	16"	41 cm

Optional equipment available with any of the models:

1. Stand that supports the unit and holds a pan in position for filling
2. Lift-off cover
3. Basket inserts
4. Fill faucet with bracket
5. Manual stirrers
6. Motor driven agitator



Unpacking The Kettle

The unit will arrive completely assembled in a box. Immediately upon receipt, inspect the box carefully for exterior damage and then open the container. Inspect the unit for concealed damage. Report any shipping damage or incorrect shipments to the delivery agent.

A warranty registration card will be attached to the kettle. Fill out this card and mail it to Groen. Also write down the model number, serial number, and installation date of your unit and file this information for future reference. Space for these entries is provided at the top of the Maintenance and Service Log on Page 17.

To remove the kettle from the box, cut the polyester straps around the box. Detach the sides of the box from the skid, then pull the box up off the unit, taking care to avoid damage or injury by staples left in the box walls. When installation is to begin, cut the straps holding the kettle on the skid and lift the kettle straight up off the skid. Examine the packing materials to make sure no loose parts are discarded with the materials.

Installation

Your Groen Kettle is provided with all internal wiring complete and ready for final connection. A wiring diagram is furnished on the inside of the control housing service panel. Any mechanical or electrical changes must be approved by Groen's Food Service Engineering Department.

The completed unit has been operated at the factory to test all controls and heater elements.

WARNING

INSTALLATION OF THE KETTLE MUST BE DONE BY PERSONNEL QUALIFIED TO WORK WITH ELECTRICITY. IMPROPER INSTALLATION CAN RESULT IN INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

1. Set the kettle in place and level it. The base may be fastened to a table or work surface. Installation under a ventilation hood is recommended.
2. Provide the proper electrical power supply as specified on the electrical information plate attached to the equipment. Observe local codes and/or The National Electrical Code in accordance with ANSI/NFPA 70-latest edition.

TDB/7 ELECTRICAL SPECIFICATIONS

VOLTAGE	PHASE	20 QUART		40 QUART	
		KW	AMP	KW	AMP
208	1	6.3	31	10.8	52
240	1	6.3	27	12.0	50
480	1	6.3	14	12.0	25
208	3	6.3	18	10.8	30
240	3	6.3	16	12.0	30
480	3	6.3	8	12.0	15
380	3	5.3	8	10	15
415	3	6.3	9	12	17

3. The equipment is shipped for three phase operation. Refer to the wiring diagram for single phase operation.
4. Bringing the electrical service through the entrance at the rear of the support housing, make a waterproof connection with the incoming lines. (A BX connection is not recommended.) **ELECTRICALLY GROUND THE UNIT AT THE TERMINAL PROVIDED.**
5. Confirm that the jacket water level is between the marks on the gauge glass. If the level is low, follow the instructions under "[Jacket Filling and Water Treatment](#)" in the "Maintenance" section of the manual.
6. The open end of the elbow on the outlet of the safety valve must be directed downward. If it is not, turn the elbow to the correct position.
7. Any mechanical or electrical change must be approved by the Groen Division Food Service Engineering Department.

Initial Start-Up

Now that the kettle has been installed, you should test it to ensure that the unit is operating correctly.

1. Remove all literature and packing materials from the interior and exterior of the unit.
2. Turn on the electrical service to the unit.
3. Put a small amount of water into the kettle.
4. Following "To Start Kettle" instructions in the "[Operation](#)" section of this manual (Page 7), begin heating the water at the highest thermostat setting. The pilot light should come on immediately, and heating should continue until the water boils.
5. To shut down the unit, turn the thermostat dial to "OFF".

If the kettle functions as described above, it is ready for use. If the unit does not function as described, call your local Groen Authorized Service Agent.

Operation

The operator controls operation of the kettle with the thermostat dial. The dial turns electric power for the heating elements on or off and sets the operating temperature of the kettle.

A. To Start Kettle

1. EVERY DAY make sure that the jacket water level is between the marks on the gauge glass. If the level is below the lower mark, see "[Jacket Filling and Water Treatment](#)" in the "Maintenance" section of this manual (Page 8-10).
2. Check the pressure gauge. If the gauge does not show 20 to 30 inches of vacuum (that is, a reading of 20 to 30 below 0), see "[Jacket Vacuum](#)" in the "Maintenance" section of this manual (Page 8).
3. Turn on the electrical power supply to the unit.
4. Turn the thermostat dial to the desired setting. Glowing of the red pilot light indicates that the kettle is heating, and cycling of the light on and off indicates that the kettle is being held at the set temperature. Once in each cycle the contactors in the support housing will make a clicking sound.

B. To Shut Down Kettle

1. Turn the thermostat dial to "OFF".
2. For prolonged shut-down, or before cleaning the outside of the unit, shut off the power supply to the unit.

Sequence of Operation

The following "action-reaction" outline is provided to help the user understand the actual functioning of the equipment.

When the operator starts up the kettle by turning the operating thermostat dial from "OFF" to a desired setting, the thermostat switch closes. This action lights the pilot lamp and causes the contactors to close, allowing power to flow to the heating elements. When the temperature of the steam jacket reaches the value corresponding to the dial setting, the thermostat switch opens. This action turns off the pilot lamp and causes the contactors to open, stopping the flow of power to the heaters. As soon as the thermostat senses that the kettle is cooling below the set point, the thermostat switch closes, the pilot lamp lights, the contactors close, and the heaters come on again. On-off cycling continues, maintaining the kettle at the set temperature and resulting in the pilot light cycling seen during normal operation.

Every time the kettle is tilted, the tilt cut-off switch interrupts the power supply to the heaters, so the heating elements will not operate while they are not submerged in the jacket water. If steam pressure greater than 50 PSI is generated in the jacket, the safety valve will open and relieve the excess pressure. In the event that the jacket water level gets too low and the heating elements overheat, the high-limit thermostat will open and shut off power to the elements until the kettle cools.

Setting the operating thermostat dial to "OFF" shuts down all control and heating circuits.

Maintenance & Cleaning

A. MAINTENANCE

NOTE

**CONTACT GROEN OR AN AUTHORIZED GROEN REPRESENTATIVE
WHEN REPAIRS AND MAINTENANCE ARE REQUIRED.**

1. **Periodic Maintenance** A Maintenance & Service Log is provided with the warranty information. Each time maintenance is performed on your Groen equipment, enter the date on which the work was done, what was done, and who did it. File the log with the warranty.

Periodic inspection can minimize equipment down time and increase the efficiency of operation. The following points should be checked regularly.

- a. The pressure/vacuum gauge should show a vacuum of 20 to 30 inches, when the kettle is cold. If it does not, see "[Jacket Vacuum](#)" below.
- b. The jacket water level should be between the marks on the gauge glass. If the level is low, see "[Jacket Filling and Water Treatment](#)" below.
- c. Electrical wiring should be kept securely connected and in good condition.
- d. The inside of the support housing should be kept clean.
- e. At least twice a month, the safety valve should be checked to make sure that it works freely. When gauge pressure is about 5 PSI, lift the valve lever and quickly let it snap back into place. Steam should escape if the safety valve is functioning properly.

WARNING

**DO NOT EXPOSE YOURSELF TO THE ESCAPING STEAM. A SEVERE
BURN CAN RESULT ON EXPOSED SKIN.**

- f. At least twice a year grease the two trunnion bearings. If the bearings are loose or hard to turn, replace both bearings.
2. **Jacket Vacuum** When the kettle is cold, a positive pressure reading or a reading around zero on the pressure/vacuum gauge indicates the pressure of air in the jacket. Air in the jacket slows down the heating of the kettle. To remove air:
- a. Start the unit. (See the "[Operation](#)" section of this manual.)
 - b. When the pressure/vacuum gauge reaches a positive pressure reading of 5 PSI, release the entrapped air and steam by lifting the lever on the safety valve for about 1 second. Repeat this step, then let the valve lever snap back into the closed position.

WARNING

AVOID ANY EXPOSURE TO THE STEAM BLOWING OUT OF THE SAFETY VALVE. A SEVERE BURN CAN RESULT ON EXPOSED SKIN.

3. Jacket Filling and Water Treatment The jacket has been charged at the factory with the proper amount of treated water. You may need to restore the water to its proper level, either because water was lost as steam during venting or because treated water was lost by draining. The procedure for adding water follows:

- a. If you are replacing water lost as steam, use distilled water. If you are replacing treated water that ran out of the jacket, prepare more treated water as directed below.
- b. Allow the kettle to cool. Turn the elbow on the safety valve counter clockwise (to avoid thread damage) until the opening of the elbow faces upward.
- c. Open the safety valve and pour the water or treated water in at the elbow until the water level rises to a point between the marks on the gauge glass. **BEFORE YOU HEAT THE KETTLE FOR ANY PURPOSE, TURN THE ELBOW CLOCKWISE UNTIL THE OPENING AGAIN FACES DOWNWARD.**
- d. Air introduced to the jacket during the filling operation must be removed to obtain efficient heating. See ["Jacket Vacuum"](#) above.

Water Treatment Procedure

WARNING

TO AVOID INJURY, READ AND FOLLOW ALL PRECAUTIONS STATED ON THE LABEL OF THE WATER TREATMENT COMPOUND.

- (1). Fill the mixing container with the measured amount of water required. (See the [table](#) below.) Distilled water is recommended.
- (2). Hang a strip of pH test paper on the rim of the container, with about 1 inch of the strip below the surface of the water.
- (3). Measure the water treatment compound you will be using. (One way to do this is to add the compound to the water from a measuring cup.)
- (4). Stir the water continuously, while you slowly add water treatment compound, until the water reaches a pH between 10.5 and 11.5. Judge the pH by frequently comparing the color of the test strip with the color chart provided in the pH test kit. People mixing the treated water solution that are color blind must use an Electroanalytical Instrument to measure the pH level or have a person that is not color blind read the test strip color level.
- (5). Record the exact amounts of water and treatment compound used. These amounts may be used again, if the same sources of water and compound are employed to refill the jacket in the future. However, it is advisable to check the pH every time treated water is prepared.

Model	Kettle Capacity	Jacket Capacity
TDB/7-20	20 quarts	4 quarts
TDB/7-40	40 quarts	5 quarts

4. Component Replacement

WARNING

BEFORE REPLACING ANY PARTS, DISCONNECT THE UNIT FROM THE ELECTRIC POWER SUPPLY.

All internal wiring is marked as shown on than circuit schematic drawings. Be sure that new components are wired in the same manner as the old components.

B. CLEANING

1. Suggested Tools

- a. Detergent and sanitizer, or a combination cleaning-sanitizing agent like Micro-Quat from Economics Laboratory.
- b. Kettle brush

2. Precautions Before any cleaning operation, shut off the kettle by turning the thermostat dial to "OFF", and shut off all electric power to the unit at a remote switch, such as the circuit breaker.

WARNING

KEEP WATER AND SOLUTIONS OUT OF CONTROLS AND ELECTRICAL EQUIPMENT. NEVER SPRAY OR HOSE THE SUPPORT HOUSING, ELECTRICAL CONNECTIONS, ETC.

WARNING

MOST CLEANERS ARE HARMFUL TO THE SKIN, EYES, MUCOUS MEMBRANES AND CLOTHING. PRECAUTION SHOULD BE TAKEN TO WEAR RUBBER GLOVES, GOGGLES OR FACE SHIELD AND PROTECTIVE CLOTHING. THESE ARE MINIMUM PRECAUTIONS TO BE TAKEN. CAREFULLY READ DIRECTIONS AND ALL WARNINGS ON THE LABEL OF THE CLEANER TO BE USED.

3. Procedure

- a. Clean all food-contact surfaces as soon as possible after use, preferably while the kettle is still hot. If the unit is in continuous use, thoroughly clean and sanitize both interior and exterior at least once every 12 hours.

- b. Scrape and flush out large amounts of food residues. Be careful not to scratch the kettle with metal implements.
- c. Prepare a hot solution of the detergent/cleaning compound as instructed by the supplier. Clean the unit thoroughly. A cloth moistened with cleaning solution can be used to clean controls, control housings, electrical conduits, etc.
- d. Rinse the kettle thoroughly with hot water, then drain completely.
- e. As part of the daily cleaning program, clean all external and internal surfaces that may have been soiled. Remember to check such parts as the sides of the unit, control housing, etc.
- f. To remove materials stuck to the equipment, use a brush, sponge, cloth, plastic or rubber scraper, or plastic wool along with the detergent solution. To minimize the effort required in washing, let the detergent solution sit in the kettle and soak into the residue, or heat the detergent solution briefly. Do NOT use any abrasive materials or metal implements that might scratch the surface, because scratches make the surface hard to clean and provide places for bacteria to grow.

Do NOT use steel wool, which may leave particles imbedded in the surface and cause eventual corrosion and pitting.

- g. The exterior of the unit may be polished with a recognized stainless steel cleaner like "Zepper" from Zep Manufacturing Company
- h. When the equipment needs to be sanitized, use a sanitizing solution equivalent to one that supplies 200 parts per million available chlorine. Obtain advice on the best sanitizing agent from your supplier of sanitizing products. Following the supplier's instructions, apply the sanitizing agent after the unit has been cleaned and drained. Rinse off the sanitizer thoroughly.

CAUTION

NEVER LEAVE A CHLORINE SANITIZER in contact with stainless steel surfaces LONGER THAN 30 MINUTES. Longer contact can cause corrosion.

- i. It is recommended that each piece of equipment be sanitized just before use by flushing thoroughly with sanitizing solution.
- j. If there is difficulty removing mineral deposits or a film left by hard water or food residues, clean the kettle thoroughly and then use a deliming agent, like Lime-Away from Economics Laboratory, in accordance with the manufacturer's directions. Rinse and drain the unit before further use.
- k. If especially difficult cleaning problems persist, contact your cleaning product representative for assistance. The supplier has a trained technical staff with laboratory facilities to serve you.

Troubleshooting

Your Groen kettle is designed to operate smoothly and efficiently if properly maintained. However, the following is a list of checks to make in the event of a problem. Wiring diagrams are furnished inside the service panel. If an item on the list is followed by an asterisk (*), the work should be done by a qualified service representative.

Troubleshooting

SYMPTOM	WHAT TO CHECK
Kettle will not heat, and pilot light will not come on.	a. Electric power supply to the unit
	b. Control circuit fuses at the back of the support housing. Replace a blown fuse only with a fuse of the same AMP rating.
	c. For loose or broken wires.*
	d. Tilt cut-off switch. (Page 13, Ref. 28).*
	e. That high-limit thermostat is closed (Page 13, Ref. 49).*
	f. Operation of variable thermostat (Page 13, Ref. 16).*
Kettle will not heat, but pilot light comes on.	a. Contactor (Page 13, Ref. 30).*
	b. Heater elements with ohmmeter for ground short or open element. If element is defective, call Groen.*
Kettle continues heating after it reaches the desired temperature.	a. Thermostat dial setting.
	b. Thermostat calibration (Page 13, Ref. 16).
	c. Thermostat operation. The thermostat should click when the dial is rotated above and below the setting for the temperature of the kettle. (Page 13, Ref. 16).
	d. Contactor, to determine whether it is de-energized. (Page 13, Ref. 30).*
Kettle stops heating before it reaches the desired temperature	a. Thermostat dial setting.
	b. Thermostat calibration (Page 13, Ref. 16).'
	c. Thermostat operation. The thermostat should click when the dial is rotated above and below the setting for the temperature of the kettle. (Page 13, Ref. 16).*
<p style="text-align: center;">WARNING</p> <p style="text-align: center;">USE ONLY FACTORY AUTHORIZED PARTS. SUBSTITUTING UNAUTHORIZED PARTS OR GENERIC PARTS CAN CAUSE BODILY INJURY TO THE OPERATOR AND DAMAGE TO THE EQUIPMENT.</p>	
Kettle heats slowly.	a. For air in the jacket. See " Jacket Vacuum " in the "Maintenance" section of this manual (Page 8).
	b. Heater elements with ohmmeter for ground short or open element. If an element is defective, call Groen.
	c. Voltage of main power source.*
Safety valve pops.	a. For air in the jacket. See " Jacket Vacuum " in the "Maintenance" section of this manual (Page 8).
	b. Thermostat dial setting.
	c. Thermostat operation. Thermostat should click when the dial is rotated above and below the setting for the temperature of the kettle. (Page 13, Ref. 16).*
	d. Safety valve. If the valve pops at pressures below 49 PSI, replace it (Page 13, ref. 23).
	e. Contactor, to determine whether it is de-energized. (Page 13, Ref. 30).

References

KLENZADE SALES CENTER
 ECOLAB, Inc.
 370 Wabasha
 St. Paul, Minnesota 55102
 800/328-3663 or 612/293-2233

NATIONAL FIRE PROTECTION ASSOCIATION
 60 Battery March Park
 Quincy, Massachusetts 02269

NFPA/54	Installation of Gas Appliances & Gas Piping
NFPA/70	The National Electric Code

NATIONAL SANITATION FOUNDATION
3475 Plymouth Rd.
Ann Arbor, Michigan 48106

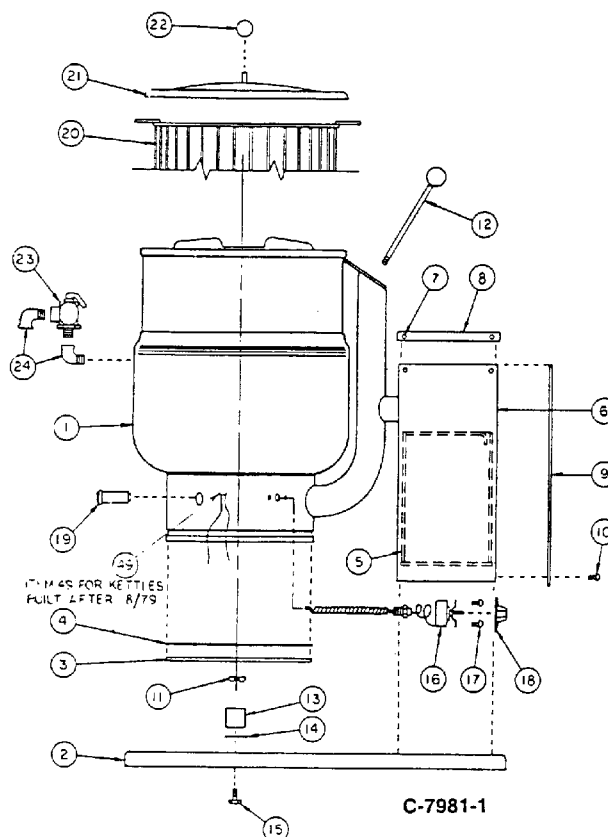
UNDERWRITERS LABORATORIES, INC.
333 Pfingsten Rd.
Northbrook, Illinois 60062

ZEP MANUFACTURING
1390 Lunt Avenue
Elk Grove Village, Illinois 60007

Parts List

(For units manufactured before June 1, 1990)

To order parts, contact your authorized Groen Service Agency. Supply the model designation, part description, part number, and quantity desired.

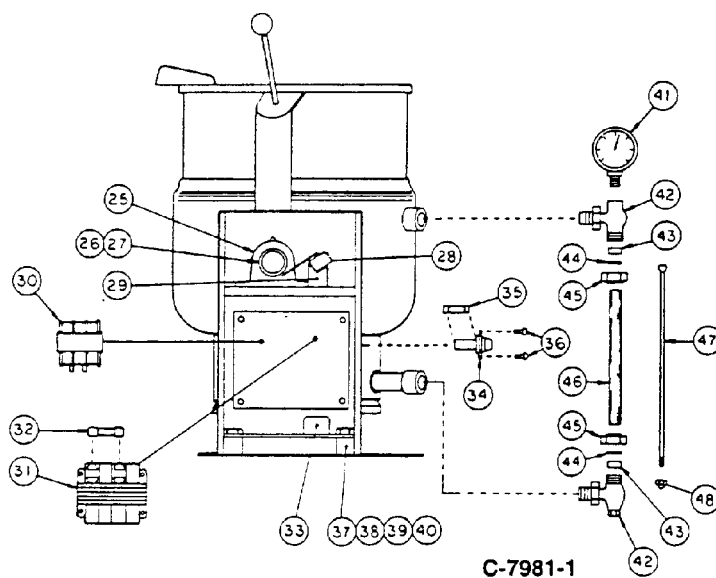


ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
2	54174	BASE ASSY	25	2989	BLOCK, PILLOW, 1-1/2"
3	3141	BOTTOM COVER	26	3118	COLLAR, SET
4	7937	GASKET, U-CHANNEL	28	2982	MICRO SWITCH
6	3148	PEDESTAL CLADDING, 480V ONLY	29	2998	BRACKET, MICRO SWITCH
8	3137	CAP, PEDESTAL	30	(See table)	CONTACTOR
9	3136	COVER, TDB/7-40	31	12827	TRANSFORMER
12	12695	HANDLE ASSY	32	2651	FUSE, 3 AMP, 480V ONLY
13	12692	RING, TOLERANCE	33	2864	TERMINAL BLOCK, 208-240V
16	12313	THERMOSTAT	34	3119	TERMINAL BLOCK, 480V
18	2868	KNOB, THERMOSTAT	35	2944	FUSEHOLDER
19	16028	PILOT LIGHT, 208-240V	41	(See table)	FUSE
21	2986	PILOT LIGHT, 480V	42	1594	PRESSURE GAUGE
22	13496	COVER, ONE PIECE LIFT-OFF, TDB/7-40	46	2845	FITTINGS, GAUGE GLASS
23	1566	COVER, ONE PIECE LIFT-OFF, TDB/7-20	47	2987	GLASS, GAUGE
	12691	KNOB, MAROON BALL	49	3127	ROD, GAUGE GLASS GUARD
	5587	VALVE, SAFETY	49	4588	THERMOSTAT, HIGH LIMIT
			—	2916	BRACKET, BOTTOM
			—	1518	GROMMET, THERMOSTAT
			—	3492	GROMMET, TRUNNION
			—	7400	GROMMET
			—	4185	ELBOW

Parts List

(For units manufactured before June 1, 1990)

To order parts, contact your authorized Groen Service Agency. Supply the model designation, part description, part number, and quantity desired.

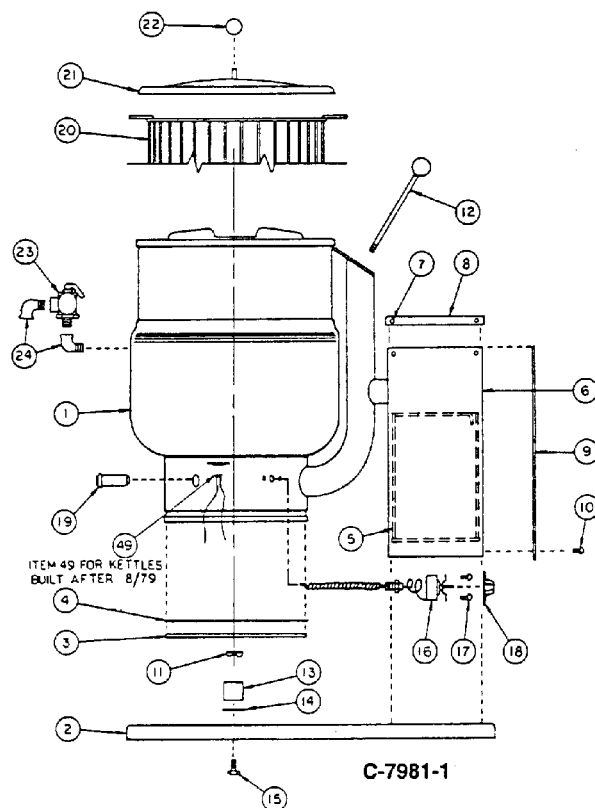


ELECTRICAL PARTS TABLE

MODEL	KW	AMP	CONTACTOR	PILOT LIGHT	TRANS- FORMER	WIRE HARNESS	FUSE
TDB/7-20							
208V/1 Ph	6.3	31	9173	16028	NONE	3175	2945
240V/1 Ph	6.3	27	9178	16028	NONE	3175	2945
480V/1 Ph	6.3	14	9576	2986	12827	3172	2651
208V/3 Ph	6.3	18	9210	16023	NONE	3174	2945
240V/3 Ph	6.3	16	9210	16025	NONE	3174	2945
480V/3 Ph	6.3	8	9574	2986	12827	3170	2651
TDB/7-40							
208V/1 Ph	10.8	52	13368	16028	NONE	3168	2945
240V/1 Ph	12	50	13368	16028	NONE	3168	2945
480V/1 Ph	12	25	9576	2986	12827	3166	2651
208V/3 Ph	10.8	30	9210	16028	NONE	3167	2945
240V/3 Ph	12	30	9210	16028	NONE	3167	2945
480V/3 Ph	12	15	9574	2986	12827	3165	2651

Parts List (For units manufactured after June 1,1990)

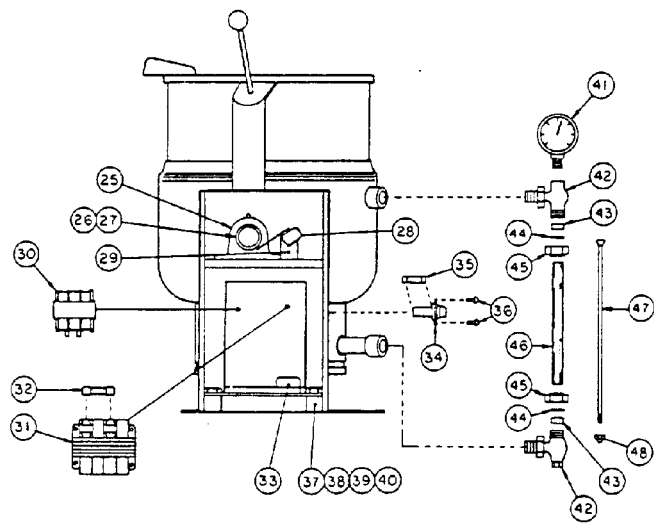
To order parts, contact your authorized Groen Service Agency. Supply the model designation, part description, part number, quantity, and, where applicable, voltage and phase.



ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
2	54174	BASE ASSY	25	2989	BLOCK, PILLOW, 1-1/2"
3	3141	BOTTOM COVER	26	3118	COLLAR, SET
4	7937	GASKET, U-CHANNEL	28	2982	MICRO SWITCH
5	3149	PEDESTAL CLADDING TDB/7-40	29	2988	BRACKET, MICRO SWITCH
6	3147	PEDESTAL CLADDING TDB/7-20	30	(See table)	CONTACTOR
7	3137	CAP, PEDESTAL	31	86876	TRANSFORMER
8	3136	COVER, TDB/7-40	32	55572	FUSE 480 V. ONLY
9	3139	COVER, TDB/7-20	33	88214	TERMINAL BLOCK
10	10655	HANDLE ASSY	34	2944	FUSEHOLDER 208/240 V. ONLY
11	10652	RING, TOLERANCE	35	(See table)	PRESSURE GAUGE
12	3248	BUMPER, TDG/7-40	41	1594	FITTINGS, GAUGE GLASS
13	3241	BUMPER, TDB/7-20	42	2845	GLASS, GAUGE
14	12313	THERMOSTAT	46	2987	ROD, GAUGE GLASS GUARD
15	2868	KNOB, THERMOSTAT	47	3127	THERMOSTAT, HIGH LIMIT
16	16028	PILOT LIGHT	49	4588	BRACKET, BOTTOM
17	13496	COVER, ONE PIECE LIFT-OFF, TDB/7-40	—	2916	GROMMET, THERMOSTAT
18	1566	COVER, ONE PIECE LIFT-OFF, TDB/7-20	—	1518	GROMMET, TRUNNION
19	12691	KNOB, MAROON BALL	—	3492	GROMMET
20	5587	VALVE, SAFETY	—	7400	GROMMET
21			—	4185	ELBOW

Parts List (For units manufactured after June 1,1990)

To order parts, contact your authorized Groen Service Agency. Supply the model designation, part description, part number, quantity, and, where applicable, voltage and phase.

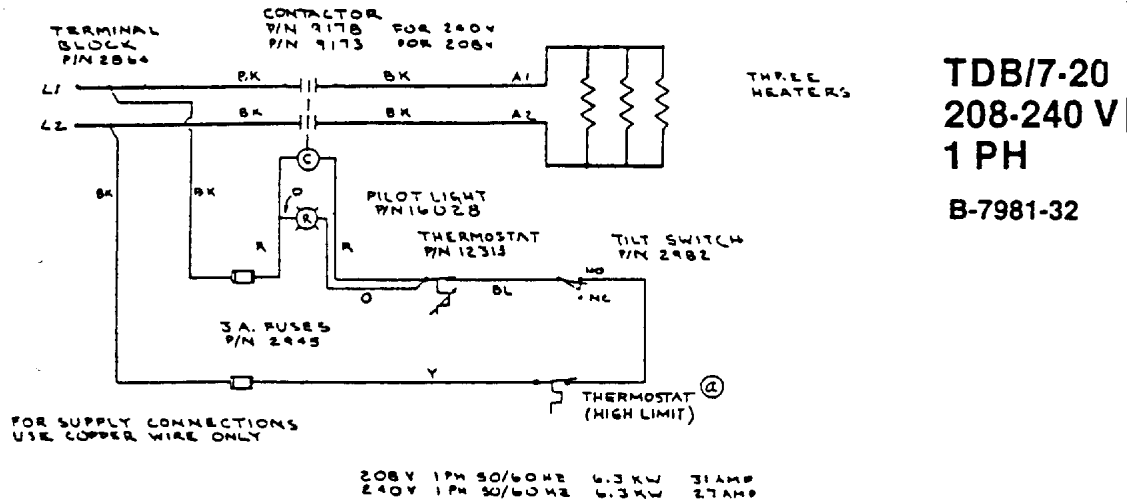


C-7981-1

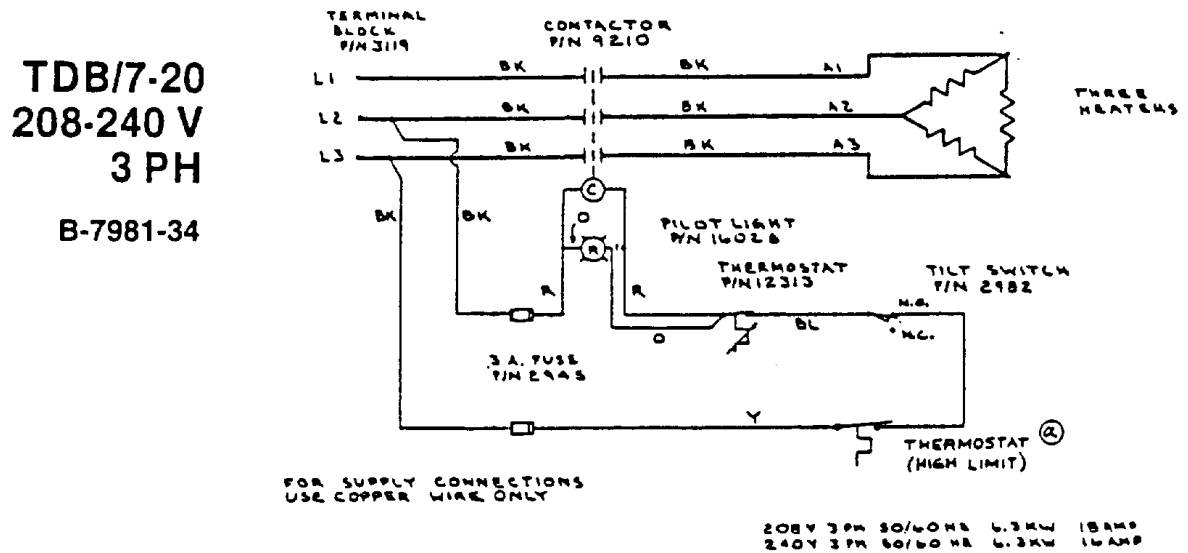
ELECTRICAL PARTS TABLE

MODEL	KW	AMP	CONTACTOR	PILOT LIGHT	TRANS- FORMER	WIRE HARNESS	FUSE
TDB/7-20							
208V/1 Ph	6.3	31	13369	16028	NONE	88210	2945
240V/1 Ph	6.3	27	13369	16028	NONE	88210	2945
480V/1 Ph	6.3	14	13369	16028	86876	88210	55572
208V/3 Ph	6.3	18	13369	16028	NONE	88210	29945
240V/3 Ph	6.3	16	13369	16028	NONE	88210	29945
480V/3 Ph	6.3	8	13369	16028	86876	88210	55572
TDB/7-40							
208V/1 Ph	10.8	52	13369	16028	NONE	88210	2945
240V/1 Ph	12	50	13369	16028	NONE	88210	2945
480V/1 Ph	12	25	13369	16028	86876	88210	55572
208V/3 Ph	10.8	30	13369	16028	NONE	88210	2945
240V/3 Ph	12	30	13369	16028	NONE	88210	2945
480V/3 Ph	12	15	13369	16028	86876	88210	55572

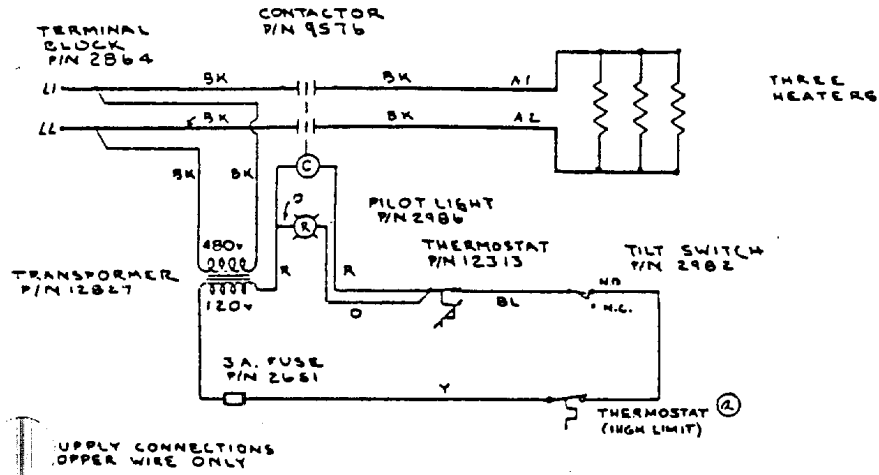
Wiring Diagrams for units manufactured before Sept 1, 1988



TDB/7-20 208-240V 1 PH



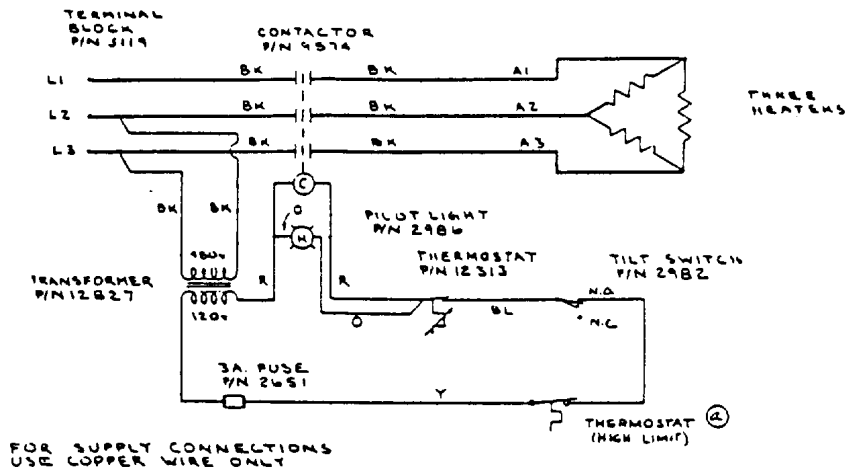
TDB/7-20 208-240V 3 PH



TDB/7-20
480 V
1 PH
B-7981-33

480V 1PH 50/60HZ 6.3KW 14AMP

TDB/7-20 480V 1 PH

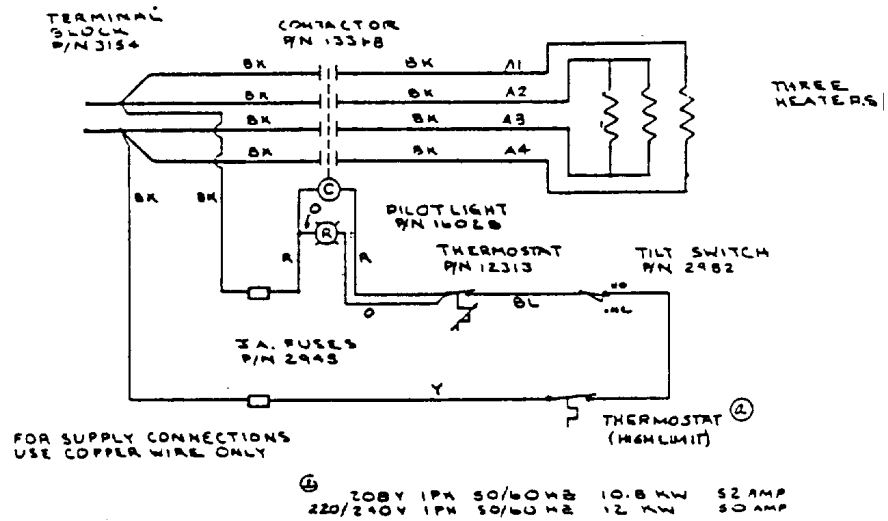


TDB/7-20
480 V
3 PH
B-7981-35

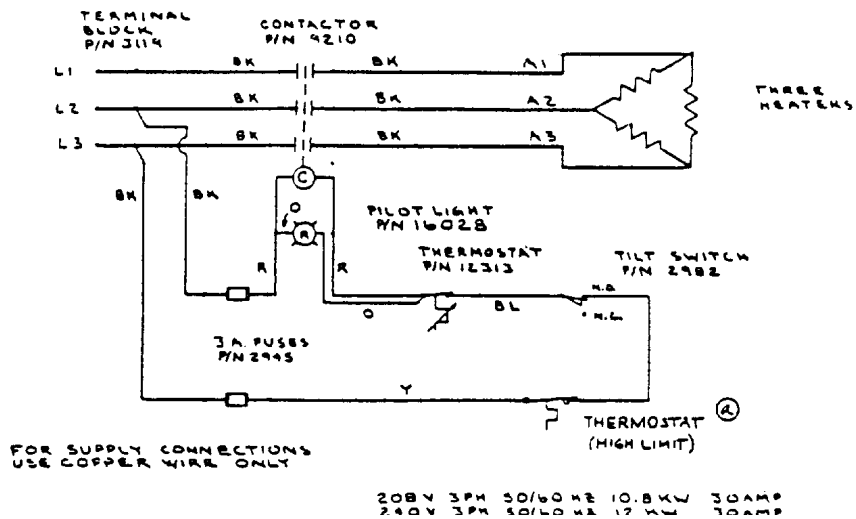
480V 3PH 50/60HZ 6.3KW 8AMP

TDB/7-20 480V 3 PH

TDB/7-40
208-240 V
1 PH
B-7981-28

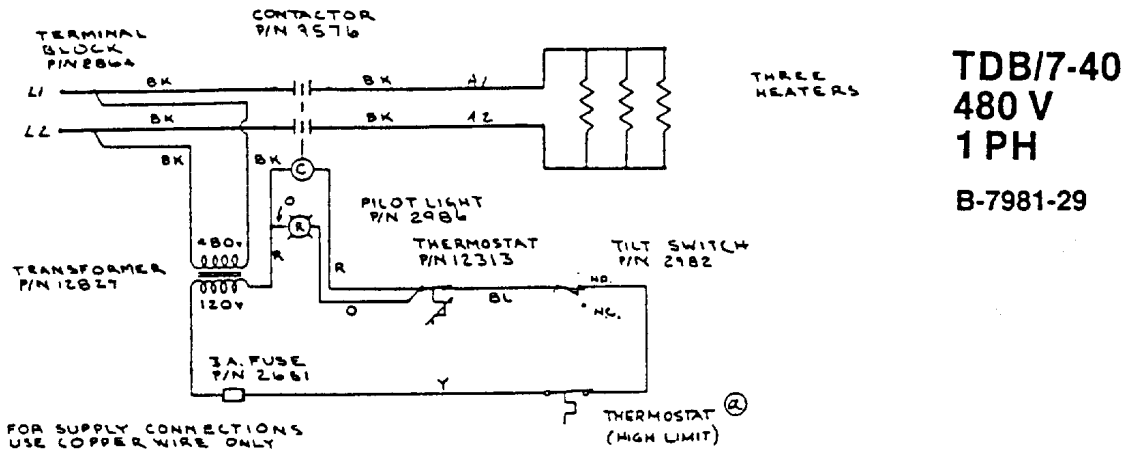


TDB/7-20 208-240V 1 PH



TDB/7-40
208-240 V
3 PH
B-7981-30

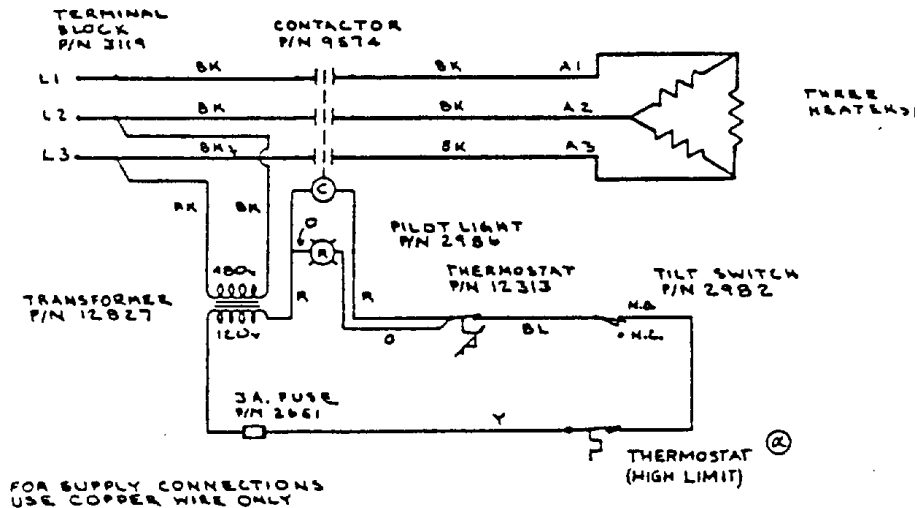
TDB/7-40 208-240V 3 PH



480V 1PH 50/60HZ 12 KW 25AMP

TDB/7-40 480V 1 PH

TDB/7-40
480 V
3 PH
B-7981-31

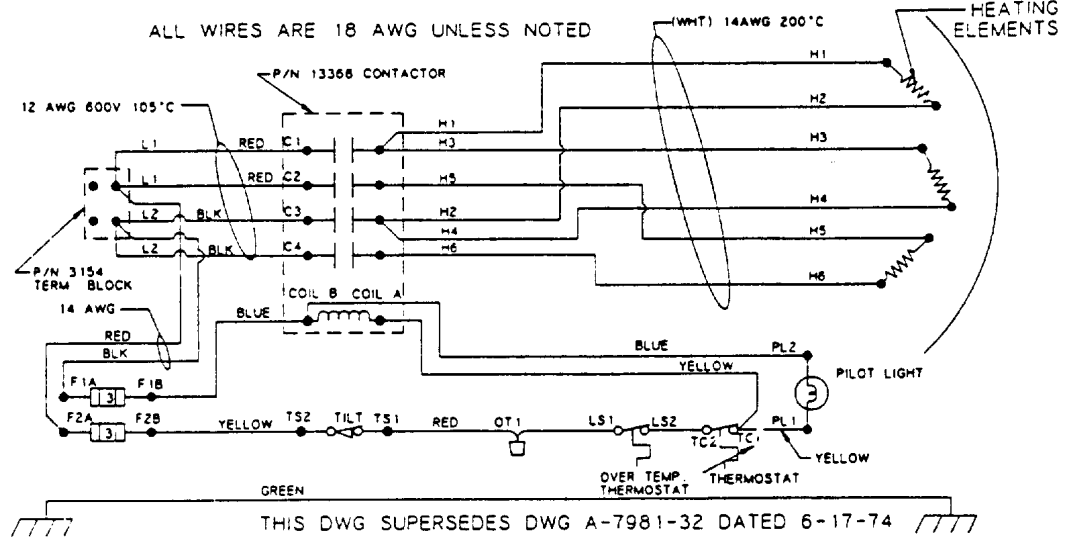


480V 3PH 50/60HZ 12 KW 15AMP

TDB/7-40 480V 3 PH

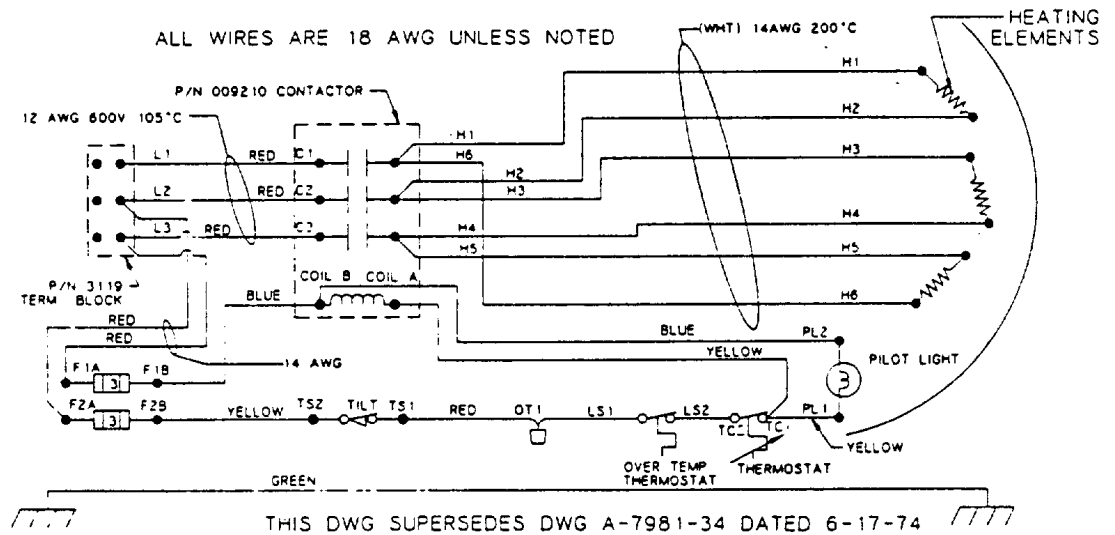
Wiring Diagrams for units manufactured after Sept 1, 1988 & before June 1, 1990

TDB/7-20
208-240 V
1 PH
B-7981-32



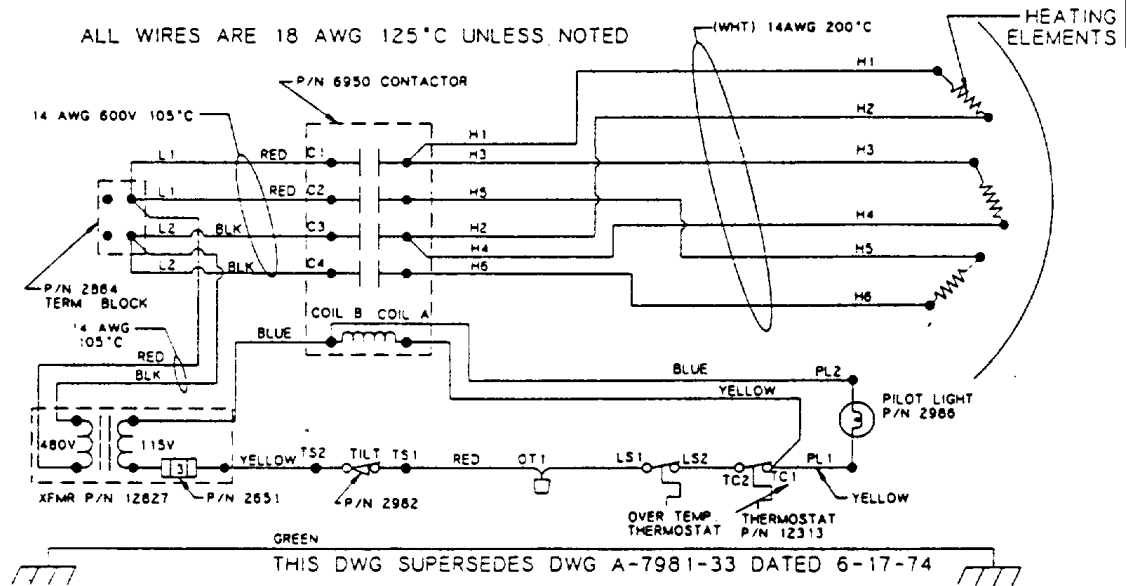
TDB/7-20 208-240V 1 PH

TDB/7-20
208-240 V
3 PH
B-7981-34



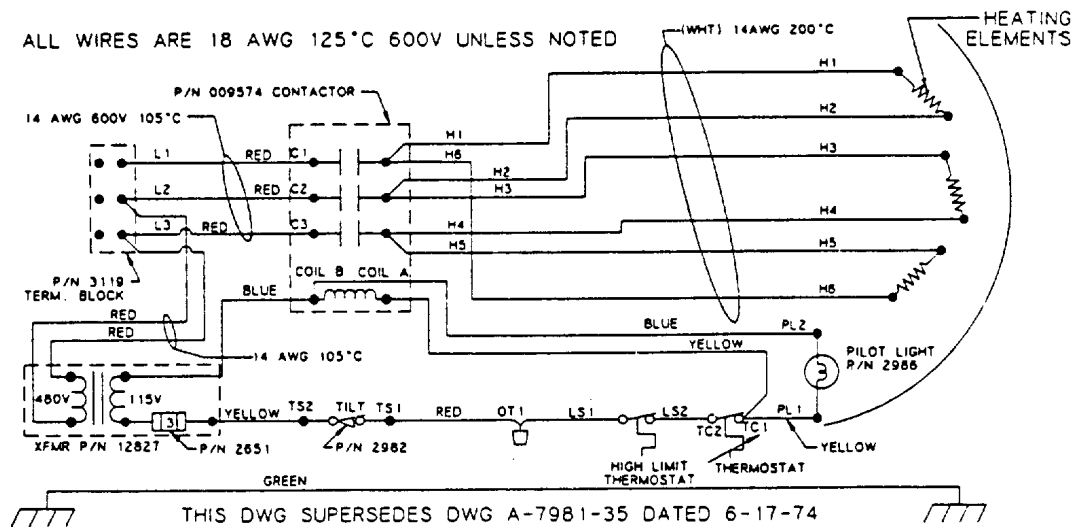
TDB/7-20 208-240V 3 PH

TDB/7-20
480 V
1 PH
B-7981-33



TDB/7-20 480V 1 PH

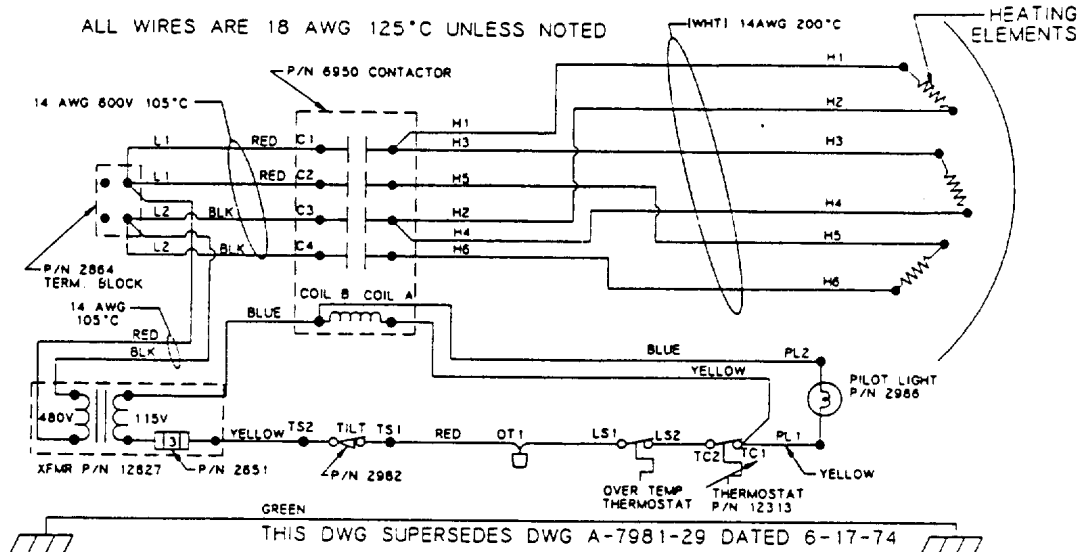
TDB/7-20
480 V
3 PH
B-7981-35



TDB/7-20 480V 3 PH

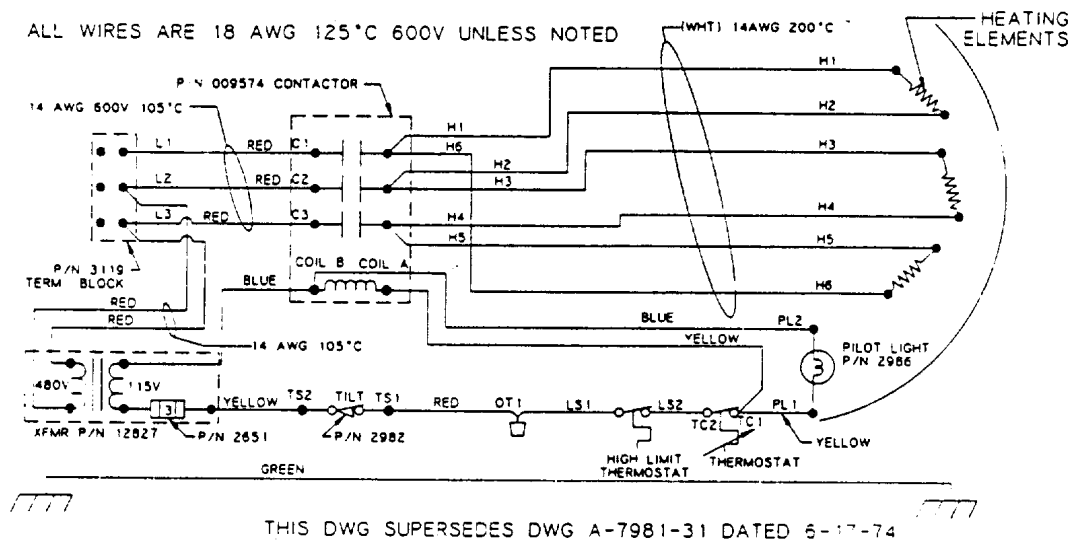
1-21

TDB/7-40
480 V
3 PH
B-7981-29



TDB/7-40 480V 3 PH

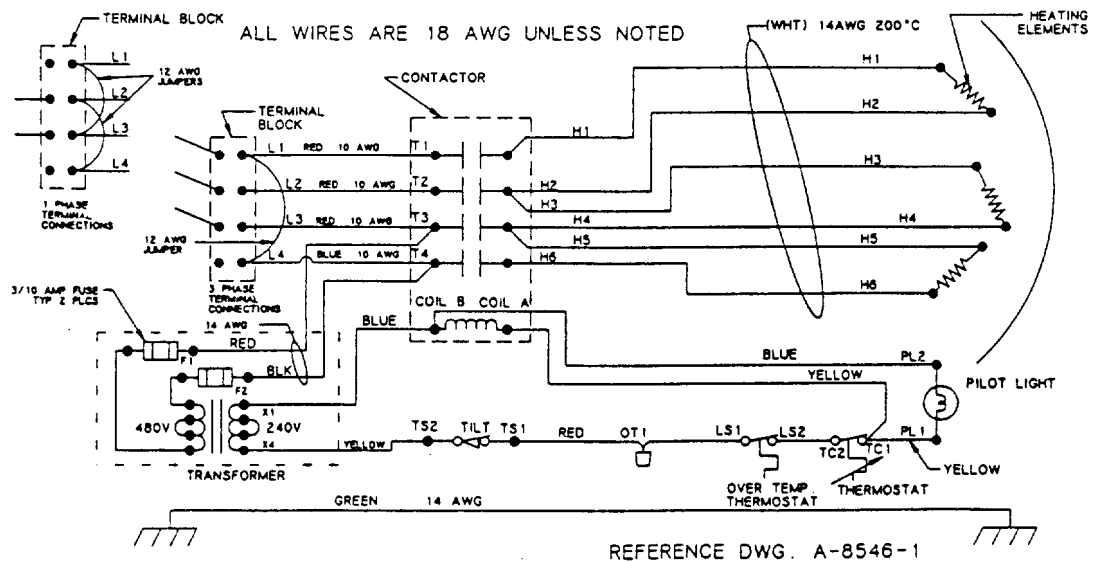
TDB/7-40
480 V
1 PH
B-7981-31



TDB/7-40 480V 1 PH

Wiring Diagrams for units manufactured after June 1, 1990

**TDB/7-20 &
TDB/7-40
480 V
1 & 3 PH
B-7981-804**



TDB/7-20 & TDB/7-40 480V 1&3 PH

Service Log

Model No. _____ Purchased From _____
 Serial No. _____ Location _____
 Date Purchased _____ Date Installed _____
 Purchase Order No. _____ For Service Call _____

Date	Maintenance Performed	Performed by

Service Log

Three-Year Limited Warranty To Commercial Purchasers*

(Domestic U.S. Sales Only)



Groen Foodservice Equipment ("Groen Equipment") has been skillfully manufactured, carefully inspected and packaged to meet rigid standards of excellence. Groen warrants its Equipment to be free from defects in material and workmanship for thirty-six months from the date the Equipment is shipped from Groen's factory (the "warranty period") on the following conditions and subject to the following limitations.

- I. This warranty is limited to Groen Equipment sold to commercial purchaser/users (but not original equipment manufacturers) and installed in the continental United States and Hawaii. This warranty extends to subsequent commercial owner/users only if the transfer of ownership does not involve movement or reinstallation of the product.
- II. Product must be inspected and registered with Groen by buyer upon receipt. Damage during shipment is to be reported to the carrier, and is not covered under this warranty.
- III. Groen, or an authorized service representative, will repair or replace, at Groen's sole election, any Groen Equipment, including but not limited to, drawoff valves, safety valves, gas and electric components, found to be defective during the warranty period. This warranty includes all parts and labor costs for the warranty period. As to warranty service in the territory described above, Groen will absorb portal to portal transportation costs (time and mileage) during the first twelve months of the warranty period; however, buyers will be liable for portal to portal transportation costs (time and mileage) during the remaining twenty-four months of the warranty period.
- IV. This warranty does not cover normal maintenance, calibration, or regular adjustments as specified in operating instructions or manuals (see operating manual of specific product); consumable parts such as scraper blades, gaskets, or packing; and/or labor involved in moving adjacent objects to gain access to the Equipment. This warranty does not cover defects caused by improper storage or handling prior to placing the Equipment; malfunction due to improper installation; damage caused by poor water quality (see recommended water standards); or the results of abuse, careless operation, or improper maintenance of the Equipment.
- V. THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EACH OF WHICH IS HEREBY EXPRESSLY DISCLAIMED. THE REM-

EDIES DESCRIBED ABOVE ARE EXCLUSIVE AND IN NO EVENT SHALL GROEN BE LIABLE FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR THE BREACH OR DELAY IN PERFORMANCE OF THIS WARRANTY.

- VI. Groen Equipment is for commercial use only. If sold as a component of another (O.E.M.) manufacturer's equipment, or if used as a consumer product, such Equipment is sold AS IS and without any written warranty.

MANUFACTURER'S CROSS-REFERENCE PARTS LIST

Part Number	Description	Vendor
5587 2845	Safety Valve 50 PSI Gauge Glass Fitting	Consolidated Brass P.O. Box 125 Pageland, SC 29728
12313 2868	Thermostat Thermo- stat Knob	Robert Shaw Controls 2328 Kingston Pike, Southwest Knoxville, TN 37901
2989	Pillow Block	Triangle Mfg. P.O. Box 1096 150 Libbey Ave. Oshkosh, WI 54901
2982	Microswitch	Microswitch Freeport, Ill 61032
2986	Pilot Light	Leecraft "Snaplite" 21-16 44th Road Long Island City, NY 11101
9574	Contactor 3 Pole	Arrow Hart 1000 W. Foster Ave. Bensenville, Ill 60106
3119	Terminal Block	Undewriters Safety Device 4332 No. Kedzie Ave. Chicago, Ill 60618
12827	Transformer	Micron Industries 1830 North 32nd Ave. Stone Park, Ill 60165
2651	3 AMP fuse	Bussman Mfg. University at Jefferson St. Louis, Mo. 63107
1594	Pressure Gauge	Marshalltown Mfg. 710 So. 12th Street Marshalltown, Iowa 50158
2987	Gauge Glass	Fred S. Hickey Co. 9601 River Road Schiller Park, Ill 60176

REAR SECTION

(Insert Classif. of TMDER Here and At Bottom of Page) CLASSIFICATION:

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4. REV. NO./DATE OR TM CH. NO./DATE		5. SYSTEM/EQUIPMENT NOMENCLATURE			6. SYSTEM/EQUIPMENT IDENTIFICATION/(MK/MOD/AN/PART NO.)		
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						E. COMPLETE	
						F. INCOMPLETE	
8. GENERAL COMMENTS							
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					13. AUTOVON/COMM. NO.		
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